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F4W

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(54) Heating apparatus with fire effect

(57) Heating apparatus, such as an electrical radiant/convector heater, is provided with means to give an impression of a burning fire. The "fire effect" is provided by means 13 for simulating fuel, a light source 10, 11 for illuminating the simulated fuel and first and second reflectors 16, 17 which co-operate to provide multiple and/or expanded reflected images of the simulated fuel. In a preferred arrangement, the simulated fuel is located between a rear reflector 16 and a front reflector 17, the front reflector being transmissive to light to enable the multiple images to be perceived from the exterior of the heater. A tinted, light transmissive front panel 19 obscures the "fire effect" when the means for simulating fuel is not illuminated.

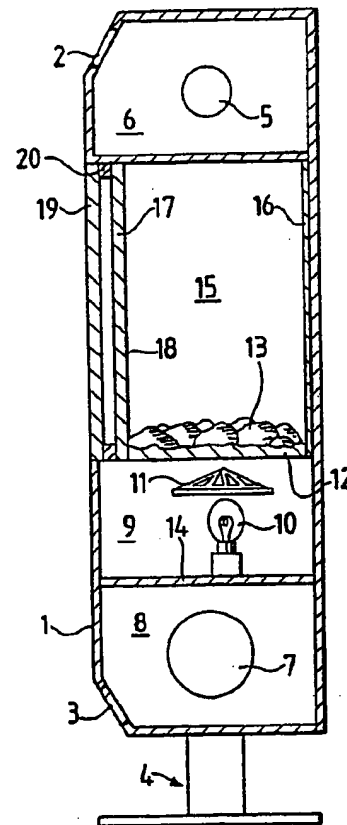


FIG. 2.

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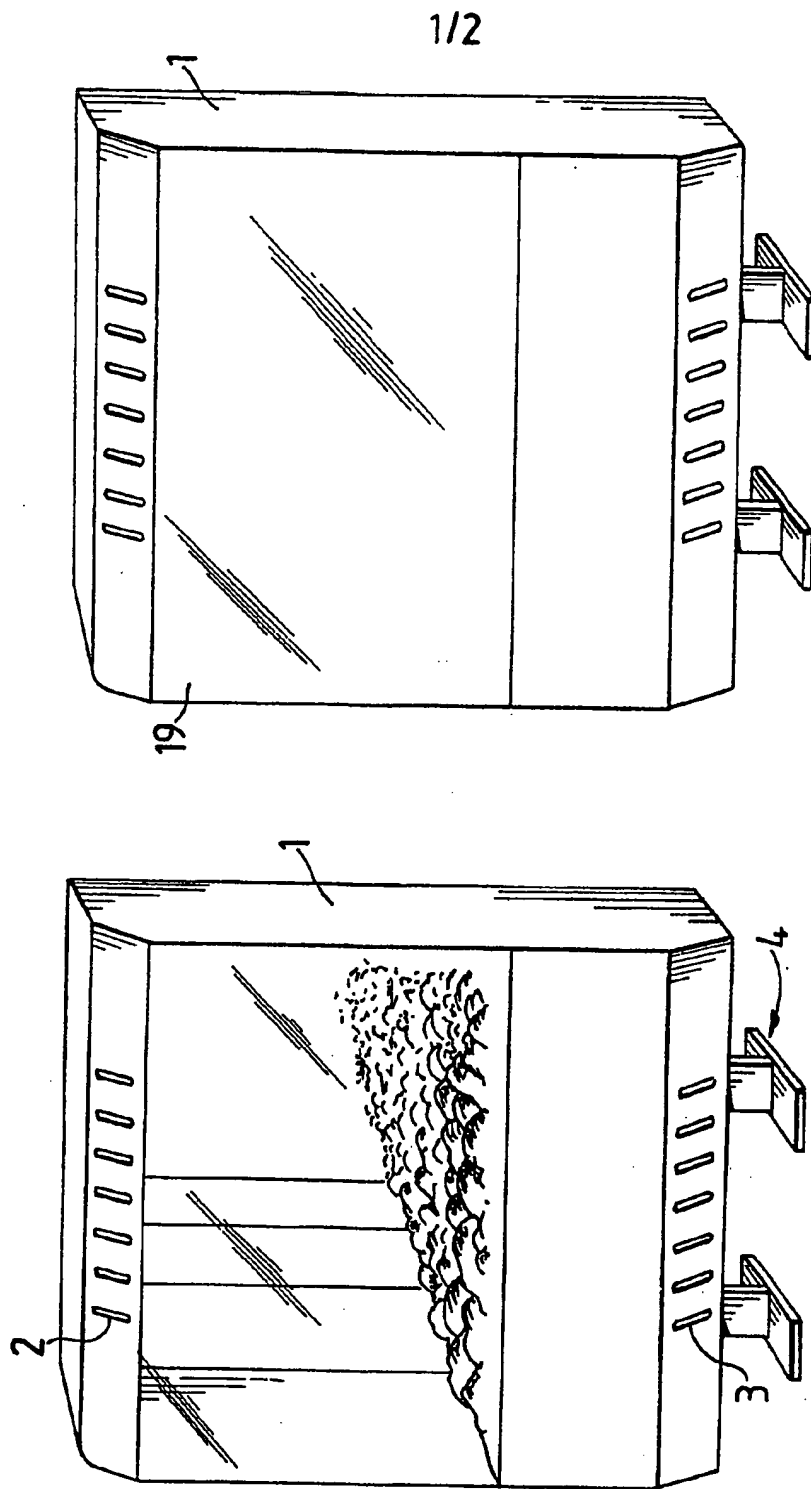


FIG.1b.

FIG.1a.

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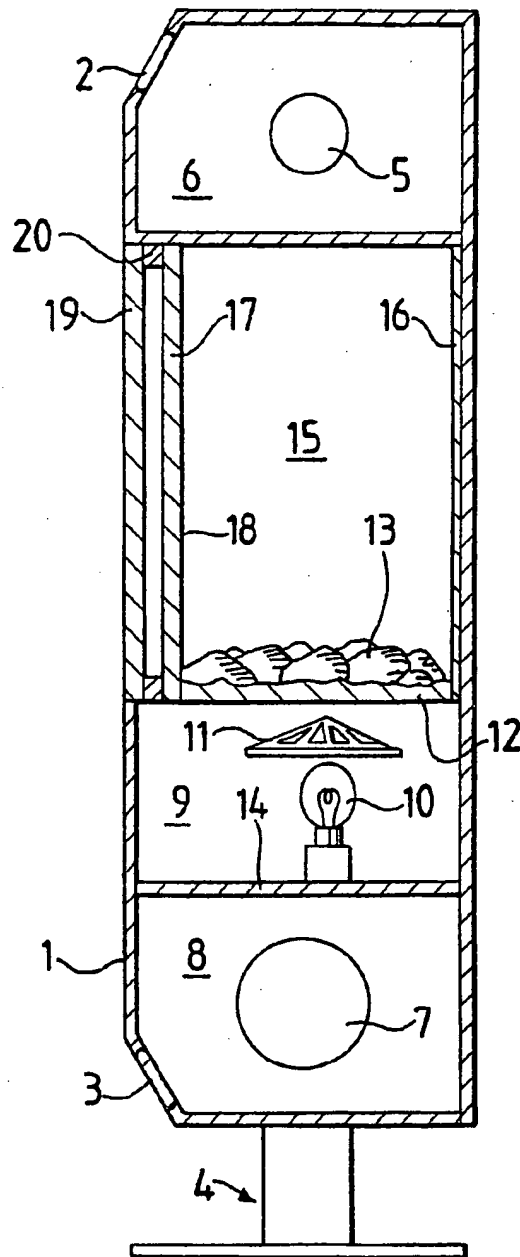


FIG. 2.

SPECIFICATION

Heating apparatus with fire effect

5 This invention relates to heating apparatus, such as a radiant heater and/or a convector, and/or fan heater, which includes means for providing an impression of a burning fire (herein referred to as a "fire effect").

Conventionally means for providing a "fire effect" usually include a semi-translucent cover in the form of a plastics moulding which is shaped and decorated to resemble pieces of solid fuel, such as lumps of coal or logs. This cover is positioned over a housing which contains a red or orange tinted electric light bulb (to provide a source of tinted light as well as heat) and a light circular, multi-blade fan which is centrally mounted on a pivot pin above the bulb (so as to be rotated by thermal convection currents generated by the heat of the bulb). The tinted light produced by the bulb is intermittently interrupted by the passage of the fan blades whereby the beams of tinted light pass through translucent parts of the cover (e.g. between the imitation lumps of coal or logs) thereby providing a flickering effect which helps to simulate a glowing coal or log fire.

Whilst the effect may be heightened by placing a single sheet of reflective material at the rear of the cover, such conventional means for providing a "fire effect" are not wholly satisfactory. For example, the semi-translucent cover which is shaped and decorated to resemble glowing pieces of solid fuel is often far smaller in its extent than a real bed of burning fuel. Only a small cover may be used in cases where only a limited amount of space is available in which to locate the means for providing the "fire effect". This is a particular problem in the case of "slim-line" designs of electrical heaters, i.e. those having a shallow front-to-back dimension. Moreover, where such conventional means are unprotected, they rapidly become dirty and dusty, especially due to the local convection currents, and the reality of the "fire effect" is thereby considerably diminished. A further disadvantage is apparent when the "fire effect" or the heating apparatus is switched off. The simulation of a glowing fuel bed then almost entirely loses its effect and is simply seen as a poor imitation of a real fire. This poor imitation is incongruous in warmer weather and it does not provide any cheerful "fire effect" in colder weather where, for example, the heating apparatus may be used to produce a low thermal output without the "fire effect" being switched on.

In accordance with the present invention, heating apparatus comprises means for providing a thermal output, means for simulating fuel, a light source for illuminating the simulated fuel, reflective means to provide expanded and/or multiple reflected images of said simulated fuel, said first reflective means being arranged so that said images can be perceived, as a visible effect, from the exterior of the heating apparatus.

Preferably, first and second reflective means arranged to provide front-to-back multiple images. In this case, the first reflective means is capable of transmitting light as well as reflecting light. Suitably, the first reflective means comprises a sheet of trans-

parent material, such as glass, which has a partially reflective coating on one side. This sheet protects the means for producing the "fire effect" and thereby prevents the ingress of dirt and dust. In such an arrangement, the simulated fuel is arranged between the partially-reflective transparent sheet and a rear reflective sheet (which may be a sheet of polished metal). The partially reflective sheet and the rear reflective sheet are arranged substantially parallel to one another so as to produce a kind of "tunnel" imaging effect which gives the impression of a deep or extensive fuel bed.

Other reflecting arrangements are possible. For example, convex and concave mirrors may be employed to provide an expanded image of the simulated fuel. Alternatively, or in addition, first and second reflective means can be arranged on respective opposite sides of the means for simulating fuel and a clear (i.e. fully transparent) sheet of material could be used as a front cover plate.

In cases where the means for simulating fuel is protected by a front cover plate, the means for simulating fuel will be less noticeable when the light source is switched off. However, in a preferred embodiment of the invention, the fire effect is almost totally hidden when the light source is turned off. This provides the distinct advantage that the visible effect of burning fuel is obscured when it is not required, e.g. in warmer weather. Such an advantage can be obtained by providing a cover plate which is capable of transmitting light (so that the visible effect can be observed) when the light source is switched on, but which is also capable of obscuring the visible effect when the light source is switched off. Suitably, such a cover plate is made of tinted transparent material, such as heat resistant plastics which resembles "smoked glass". The cover plate may be either additional to a partly reflective/partly transmissive sheet which forms the first reflective means, or it may be a tinted sheet having a partially-reflective coating which also serves as the first reflective means.

In a preferred embodiment of the invention, the means for simulating fuel comprises pieces of transparent material, such as pieces of tinted glass, having irregular shapes. These pieces of glass form a layer which is supported, by means of a sheet of transparent or translucent material, preferably having an uneven surface, over a chamber in which is located one or more tinted light bulbs for driving respective "flicker-effect" fans of the type mentioned above.

In order to adjust the "fire effect" to an optimum level of illumination, dimming means (of known construction) may be connected to the light source so as to control its level of illumination.

A preferred embodiment of the invention will now be described with reference to the accompanying schematic drawings, in which:

Figure 1 is a perspective view of an electrical radiant/convector heater which incorporates means for providing a "fire effect", and

Figure 2 is a side elevation, partly in section and on a larger scale, of the heater shown in Figure 1.

Whilst the preferred embodiment will be described with reference to an electrical convector/fan heater. It

will be understood that the invention can be applied to other types of heating apparatus including those which employ means other than electricity for providing a thermal output.

- 5 The heater shown in the drawings includes an outer casing 1 having ventilation holes 2, 3 and standing on legs 4. Figure 2 schematically illustrates a convector element 5 located in an upper chamber 6 of casing 1. Similarly, a fan heater 7 is located in a lower chamber 8. A chamber 9 contains a tinted bulb 10 and a thermally driven, circular fan 11. The circular fan 11 is centrally pivoted (by means not shown, but of known construction) so that it rotates due to the thermal currents of air produced by the bulb 10 when illuminated. The bulb 10 is tinted red or orange whereby beams of tinted light, intercepted by the blades of the fan 11, are directed upwardly towards a transparent, or translucent plate 12. Sheet 12 supports pieces of tinted glass 13 having irregular shapes and intended to resemble glowing pieces of coal. Sheet 12 preferably has an uneven surface, e.g. such as a sheet of frosted glass. In an alternative arrangement (not shown), the sheet 12 and the simulated pieces of fuel 13 are made as an integral structure, e.g. in the form of a moulded sheet which simulates a bed of fuel and which is at least partially light-transmissive. The front, rear and sides of the chamber 9 are formed by parts of the casing 1 which thereby obscure light from bulb 10. The floor 14 of chamber 9 may be either opaque, or it may transmit some light downwardly into chamber 8 whereby a red or orange glow can be seen through the ventilation holes 3.

- A chamber 15, which is largely empty except for the pieces of glass 13, is situated between chambers 6 and 9. A sheet 16 of polished metal, such as aluminium, is located at the rear of chamber 15 in order to reflect light towards a sheet 17 which is partly transparent and partly reflective. Sheet 17 is preferably made of heat-resistant glass with a partially-reflective coating 18 on its inner major surface. Sheets 16 and 17 are substantially parallel whereby multiple images of the simulated fuel 13 may be observed from the exterior of the heater through a transparent cover plate 19. The cover plate 19 is preferably made of heat-resistant, tinted plastics material which resembles so-called "smoked glass". For example, sheet 19 may be tinted grey or brown so that it appears to be transparent when chamber 15 is illuminated with light from bulb 10 (see Figure 1a), and so that it appears to be opaque when bulb 10 is off (see Figure 1b). The sheet 19 is spaced from sheet 17 by means of a frame 20. The front surface of sheet 19 is flush with the front surfaces of casing 1 so as to provide a pleasing smooth finish to the front of the heater, especially when chamber 15 is not illuminated (see Figure 1b).

The floor of chamber 6 may be opaque, or it may transmit some light which can be perceived, as a tinted glow, through ventilation holes 2.

When the light bulb 10 is switched on, thermal currents of air cause the fan 11 to rotate. Beams of tinted light, intercepted by the blades of fan 11, thereby pass upwardly through sheet 12 and through and/or

15. The eye-level of an observer standing in front of the heater is normally above the centre of sheets 18, 19 whereby a series of multiple images of the simulated fuel 11 are perceived through the cover plate 19.

- 70 These multiple images are schematically illustrated in Figure 1 and give the appearance of an extensive fuel bed stretching back far beyond the rear panel of the heater. This heightens the attractiveness and effect of a glowing fuel bed, especially where the heater is of the contemporary "slim-line" design.

As the chamber 15 can be totally enclosed, this prevents the build up of dirt and dust which would otherwise detract from the "fire effect".

- The bulb 10, which may be one of a plurality each having a respective fan 11, can be connected in series with a dimming switch (of known construction) for adjusting the level of illumination of chamber 15 to an optimum value. This is useful where the level of illumination of the "fire effect" may need to be adjusted to suit different levels of illumination of a room in which the heating apparatus is installed.

Reflectors may also be provided at the sides of the fuel bed to enhance the effect of a broad extent of burning fuel.

- 90 Convex and/or concave mirrors may be used, either alone or in combination with plain or flat reflecting surfaces in order to provide distorted images which are intended to give an observer the impression of an expanded or more extensive fuel bed.

- 95 It will of course be understood that the present invention has been described above purely by way of example since modifications of detail could be made.

CLAIMS

- 100 1. Heating apparatus comprising means for providing a thermal output, means for simulating fuel, a light source for illuminating the simulated fuel, reflective means to provide expanded and/or multiple reflected images of said simulated fuel, said reflective means being arranged so that said images can be perceived as a visible effect from the exterior of the heating apparatus.
- 105 2. Heating apparatus according to claim 1 wherein said first reflective means obscures the visible effect when the light source is switched off.
3. Heating apparatus according to claim 1, including means for obscuring the visible effect when the light source is switched off.
- 115 4. Heating apparatus according to claim 3 wherein said means for obscuring the visible effect comprises a tinted transparent medium.
5. Heating apparatus according to any one of the preceding claims, wherein first and second reflective means are arranged in a substantially confronting relationship in order to provide said multiple reflected images.
- 120 6. Heating apparatus according to any one of the preceding claims wherein said simulated fuel is arranged between said first and second reflective means.
- 125 7. Heating apparatus according to any one of the preceding claims, wherein said first reflective means comprises a sheet of transparent material having a

8. Heating apparatus according to any one of the preceding claims, wherein the means for simulating fuel comprises pieces of transparent material.

9. Heating apparatus according to claim 8
5 wherein said pieces of transparent material supported above said light source such that light passes through the support and illuminates said pieces of material.

10. Heating apparatus according to claim 1
10 wherein said first and second reflective means are arranged to provide front-to-back multiple images, the first reflective means being capable of transmitting light as well as being capable of reflecting light, said means for simulating fuel being provided
15 between said first and second reflective means.

11. Heating apparatus according to claim 10 comprising means for obscuring the visible effect when the light source is switched off.

12. Heating apparatus substantially as herein described with reference to the accompanying drawings.
20

Amendments to the claims have been filed, and have the following effect:-

25 *(a) Claims 1, 5, 6, 10 and 11 above have been deleted or textually amended.

*(b) New or textually amended claims have been filed as follows:-

*(c) Claims 7, 8, 9 and 12 above have been re-
30 numbered as 6, 7, 8 and 9 and their dependencies corrected.

CLAIMS

35 1. Heating apparatus comprising means for providing a thermal output, means for simulating fuel, a light source for illuminating the simulated fuel, first and second reflective means arranged to provide front-to-back multiple images of said simulated fuel,
40 the first reflective means being capable of transmitting light as well as being capable of reflecting light, said means for simulating fuel being provided between said first and second reflective means, said reflective means being arranged so that said images
45 can be perceived as a visible effect from the exterior of the heating apparatus.

5. Heating apparatus according to any one of the preceding claims, wherein first and second reflective means are arranged in a substantially parallel confronting relationship in order to provide said multiple
50 reflected images.